REMARKS

Claims 99-115 are pending in the application with claims 99, 105, 106, 107, 108, 109, and 112 amended herein.

The Office Action requires a new title as the current title is allegedly not being descriptive. Applicants herein amend the title in compliance with the requirement.

The Office Action requires correction of the abstract to no more than 150 words. Applicants herein amends the abstract in compliance with the requirement.

The Office Action requires correction of the Related Patent Data section to fill in blank spaces present in the original specification. Applicants herein amend the Related Patent Data section in compliance with the requirement. Applicants note that the priority document U. S. Patent No. 6,346,439 is not a continuation-in-part as will appreciated from an amendment to original specification of record in the file history of the Office deleting the Related Patent Data section that incorrectly asserted continuation-in-part priority to a previous application.

Claims 99-115 stand objected to because of informalities regarding antecedent basis. Without admitting the propriety of the objection, Applicants herein amend the subject claims in compliance with the Office Action's objection. None of the amendments made to correct the alleged lack of antecedent basis are related to the statutory requirements of patentability. None of such amendments are made for the purpose of narrowing the scope of any claims and do not effectively narrow the scope of any claim.

Claims 105, 106, 108, 109, and 111 stand rejected under 35 USC 103(a) as being unpatentable over Chen in view of Jain. Claim 110 stands rejected under 35 USC 103(a)

as being unpatentable over Chen and Jain in view of Chiu. Page 13 of the Office Action states that claim 107 would be allowable if rewritten in independent form to include all the limitations of base claim 105. The subject matter of claim 107 is herein incorporated by amendment into claim 105. Accordingly, claim 105 is patentable over the cited references. Claims 106, 108, 109, 110, and 111 depend from claim 105 and are thus patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. Claim 107 is amended herein setting forth that the first and second gap region each have a lateral length of from about 150 to about 600 Angstroms. The subject matter of amended claim 107 is supported at least by page 25, lines 21-22 of the present specification.

Claims 99-115 stand rejected for obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,333,539. Applicant submits herewith a timely filed terminal disclaimer obviating the need for such rejection. Applicant thus requests withdrawal of the obviousness-type double patenting rejection.

In accordance with Applicants' assertions herein, all of pending claims 99-115 are in condition for allowance. Applicants request such allowance in the next Office Action.

Respectfully submitted,

Dated: 27 Sep 2002 By: _____

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Application Serial No. 09/998,420
Filing Date ..... November 29, 2001
Inventor ..... Aftab Ahmad
Assignee ..... Micron Technology, Inc.
Group Art Unit 2811
Examiner ..... O. Nadav
Attorney's Docket No. MI22-1885
Title: Semiconductor Transistor Devices and Structures With Halo Regions (as amended)

VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING RESPONSE TO JUNE 28, 2002 OFFICE ACTION

In the Specification

The replacement specification paragraphs incorporate the following amendments. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

The title has been amended as follows:

Semiconductor Transistor Devices and ~~Methods for Forming Semiconductor Transistor Devices~~ Structures With Halo Regions

The paragraph beginning at line 2 on page 1 has been amended as follows:

This patent resulted from a continuation of U.S. Patent No. 6,333,539, filed on October 6, 1998, that is a divisional application of U.S. Patent No. 6,346,439, filed on July 9, 1996 ~~is a continuation-in-part of U.S. patent application Serial No. 5,849,615 _____, filed on February 22, 1996, entitled "Semiconductor Processing Method of Fabricating~~

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~~Field Effect Transistors", listing the inventors as Aftab Ahmad and Kirk Prall, and which is now U.S. patent number _____~~.

The abstract has been amended as follows:

~~In one aspect, the~~ The invention encompasses a transistor device comprising a region of a semiconductor material ~~wafer~~, and a transistor gate over a portion of the region. ~~The transistor gate has a pair of opposing sidewalls which are a first sidewall and a second sidewall.~~ The device ~~further~~ comprises a pair of opposing sidewall spacers adjacent ~~the~~ sidewalls of the transistor gate and a pair of opposing first conductivity type source/drain regions within the semiconductor material ~~wafer~~ proximate the transistor gate. ~~One of the sidewall spacers extends along the first sidewall of the gate and the other of the sidewall spacers extends along the second sidewall of the gate.~~ The entirety of the semiconductor ~~wafer~~ material under one of the sidewall spacers being defined as a first segment ~~of the semiconductor wafer material~~, and the entirety of the semiconductor ~~wafer~~ material which is under the other of the sidewall spacers being defined as a second segment ~~of the semiconductor wafer material~~. The first and second segments of the semiconductor material ~~wafer~~ are separated from the first and second source/drain regions by first and second gap regions, respectively, of the semiconductor material ~~wafer~~. The device further comprises a pair of opposing second conductivity type halo regions within the first and second gap regions.

In the Claims

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

99. (amended) A semiconductor transistor structure comprising:

a region of a semiconductor wafer;

a gate over the region, the gate having first and second sidewalls;

first conductivity type heavily doped first and second source/drain regions proximate the first and second sidewalls, respectively;

first and second oxide layers extending along and at least partially covering the first and second sidewalls, respectively;

first and second sidewall spacers extending along and at least partially covering the first and second oxide layers, respectively, the entirety of the semiconductor wafer under the first and second sidewall spacers being defined as first and second segments, respectively, and the first and second segments being separated from ~~the~~ respective first and second source/drain regions by respective first and second ~~gaps~~ gap regions, no part of the first and second gap regions being under ~~the~~ respective first and second sidewall spacers; and

second conductivity type halo regions within the first and second gap regions and not extending into the first and second segments.

105. (amended) A semiconductor transistor device comprising:

a transistor gate over a semiconductor material wafer, the transistor gate having opposing first and second sidewalls;

first conductivity type, heavily doped, first and second opposing source/drain regions within the semiconductor material wafer beside ~~the~~ respective first and second sidewalls;

first and second opposing oxide layers extending along and covering the respective first and second sidewalls;

first and second opposing sidewall spacers extending along and at least partially covering ~~the~~ respective first and second oxide layers;

first and second opposing segments consisting of an entirety of the semiconductor wafer material under ~~the~~ respective first and second sidewall spacers, the first and second opposing segments being separated from the first and second opposing source/drain regions by respective first and second gap regions of the semiconductor material wafer;

second conductivity type, first and second opposing halo regions within the respective first and second gap regions and not extending into respective first and second segments; and

one of the first and second conductivity types being n-type and the other of the first and second conductivity types being p-type.

106. (amended) The device of claim 105 wherein the first and second opposing halo regions extend directly under a full lateral extent of the respective first and second source/drain regions.

107. (amended) The device of claim 105 wherein the first and second ~~halo regions do not extend into the respective first and second segments~~ gap regions each have a lateral length of from about 150 to about 600 Angstroms.

108. (amended) The device of claim 105 wherein the first and second oxide layers extend laterally out from the respective first and second sidewalls, directly under the respective first and second sidewall spacers, and directly over ~~the~~ respective first and second segments.

109. (amended) The device of claim 108 wherein the first and second oxide layers further extend past the respective first and second sidewall spacers, directly over the respective first and second gap regions, and directly over at least a portion of ~~the~~ respective first and second source/drain regions.

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112. (amended) A semiconductor transistor structure comprising:

a region of a semiconductor wafer;

a gate over the region, the gate having first and second opposing sidewalls;

first conductivity type heavily doped first and second opposing source/drain regions proximate the first and second opposing sidewalls, respectively;

first and second opposing oxide layers extending along and at least partially covering the first and second sidewalls, respectively;

first and second sidewall opposing spacers extending along and at least partially covering the first and second opposing oxide layers, respectively, the entirety of the semiconductor wafer under the first and second opposing sidewall spacers being defined as first and second segments, respectively, and the first and second segments being separated from ~~the~~ respective first and second source/drain regions by respective first and second ~~gaps~~ gap regions, no part of the first and second gap regions being under ~~the~~ respective first and second sidewall spacers; and

second conductivity type halo regions within the first and second gap regions and not extending into the first and second segments, wherein one of the first and second conductivity types is n-type and the other is p-type.

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